

COLLAPSIBLE LUGGAGE AREA PROTECTOR**FIELD OF THE INVENTION**

The invention pertains to cargo liners for vehicles, and more particularly, to the cargo liners incorporating a collapsible perimeter frame for providing shape to the cargo liner in use, while permitting the liner to be collapsed into a conveniently small package for storage.

BACKGROUND OF THE INVENTION

Almost all motor vehicles manufactured to date feature some type of storage compartment separable or separate from the passenger compartment in which a wide variety of cargo may be carried. In fact, the cargo-carrying capability of modern sport utility vehicles has, in part, accounted for their enormous popularity. Still, station wagon cargo areas and the trunk space of traditional four-door sedans all provide common utility and common problems for the vehicle owner.

One of the principal concerns of motor vehicle operators is the protection of the cargo area from damage caused by liquids or other materials such as mud, dirt, grease and grime which are often associated with the cargo being transported by the vehicle.

Certain prior art devices have been developed for protecting the cargo areas of vehicles from such damage and soil. Currently popular for such applications are flexible plastic or rubber tray-like devices which feature a floor and a perimeter wall. These devices may be placed in the cargo area, and may be designed to conform, in perimeter shape, to the shape of the cargo area. By constructing these cargo liners from durable material, such as rubber or thermoplastic, dirt and spills from cargo may be easily contained, and the light

weight and flexible nature of the cargo liners themselves permits them to be easily removed from and reinstalled in the vehicle, as needed.

It has long been recognized, however, that it is desirable to create such cargo liner which is easily foldable or stowable. One solution to this problem is found in U.S. Patent No. 5,083,831, issued to Foyen, which teaches a window shade-like retraction mechanism for a rollable and flexible cargo liner, which may be affixed to the rear seat of a motor vehicle. Another proposed solution is found in U.S. Patent No. 6,017,074, issued to Biskup, which teaches a foldable cargo liner. A cargo liner which has upstanding walls capable of providing lateral protection to the interior walls of a motor vehicle is taught by Falciani in U.S. Patent No. 5,722,710. An interesting effort is depicted in U.S. Patent No. 3,653,710, issued to Barnard, which features inflatable elements to offer support structure to the cargo liner when in use, yet allow the device to be collapsed when not in use by deflation of the inflatable elements.

Each of these prior art devices are limited by their complexity, bulk, weight, collapsed size and the time required to stow and unstow, making them unsuitable in many applications.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide a new and improved cargo liner for motor vehicles which is lightweight, readily collapsible, easily installed and removed from the motor vehicle, while still protecting the carpeting or other surfaces of the cargo area within the motor vehicle.

Another object of the present invention is to provide a new and improved cargo liner for a motor vehicle which is collapsible into a size substantially smaller than the surface area presented by the cargo area of the motor vehicle itself.

A further object of the present invention is to provide a new and improved cargo liner for motor vehicles which utilizes a collapsible perimeter frame adapted to the shape of the cargo area in which the cargo liner is installed:

A further object of the present invention is to provide an improved cargo liner for motor vehicles which is constructed of a lightweight and inexpensive material which provides a flexibility at the same time that it provides impermeability to potentially stain-causing contaminants associated with the cargo to be carried in the motor vehicle.

In summary, the present invention comprises a flexible and impermeable barrier of material which may be either fabric, thermoplastic or rubber. The material is configured so that when extended in a flat sheet, the perimeter of the material matches in shape and dimension the approximate perimeter of the cargo area in which the cargo liner is placed.

The perimeter of the cargo liner of the invention is provided with a sleeve, in which is installed a coilable steel framework having a high degree of flexibility and resiliency. The framework is configured so as to be coilable, permitting the cargo liner to be collapsed into a small package easily stowed in the vehicle or removed from the vehicle for storage, without taking up an undue amount of storage space.

These and other features of the invention are described below in further detail, with reference to the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a perspective view of the invention as installed in a typical motor vehicle environment.

FIGURE 2 is a detailed, cutaway view of a portion of the perimeter of the invention, showing the interrelationship between the liner material, the sleeve in the liner material and the frame.

FIGURES 3A-3C is a series of drawings depicting the process of folding the invention.

FIGURE 4 is a perspective view of the invention stored in its storage container.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The cargo liner **10** as shown in **Figure 1**, is preferably the size selected to fit the cargo area of a motor vehicle. This cargo area may be the bed of an open or enclosed truck or sport utility vehicle, the floor of the trunk of a conventional sedan, and in smaller sizes, the floor area of either the front or rear passenger compartment of a motor vehicle. A wide variety of sizes of cargo liners **10** may be manufactured, likewise having a wide variety of shapes corresponding to the shape of the area to be protected. In addition, the perimeter **11** of cargo liner **10** may be contoured so that the overall planiform of cargo liner **10** corresponds to the planiform of the cargo area in which the cargo liner **10** is placed.

Cargo liner **10** comprises a floor **12** and a continuous wall **14** which surrounds the perimeter of floor **12**. Wall **14** has an upper edge **16** and a lower edge **18** which is affixed, by stitching or other well known means to a sleeve **20** which is likewise continuous and surrounds the perimeter of floor **12**. Preferably, floor **12**, wall **14**, and sleeve **20** are manufactured from

a flexible material having the characteristics of high durability and low permeability, so that dirt or other solid or liquid contaminants will not permeate the fabric floor **12** or wall **14**. In this fashion, the shallow containment vessel created by floor **12** and wall **14** serves to contain solid or liquid contaminants placed within the perimeter **11**. The fabric of floor **12** and wall **14** may be treated in any of a number of well known means to render the fabric impermeable to moisture and effectively repellent to permanent staining. At the same time, the fabric of floor **12**, wall **14** and sleeve **20** is preferably of a lightweight and highly flexible material such as Dacron, nylon or thermoplastic sheeting, enabling the cargo liner **10** to be easily carried and stored in both its unfolded and folded configurations.

Figure 2 is a cutaway view of a section of the cargo liner showing a section of the floor **12** a section of the wall **14**, and of the sleeve **20**. Captured within sleeve **20** is a flexible and coilaible resilient frame **22**, preferably manufactured as a relatively thin strip of metal material, such as spring steel. Frame **22** when uncoiled is of an identical size to the maximum outer dimension of cargo liner **10** in its unfolded configuration as shown in **Figure 1**. By utilizing a spring steel frame **22** captured within sleeve **20** and surrounding floor **12**, it will be seen that when the cargo liner **10** is in its unfolded configuration, frame **22** will urge the outer perimeter **11** of cargo liner **10** to its full and unfolded configuration, placing a predetermined amount of tension on the sleeve **20**, which in turn, places tension on floor **12**, rendering the cargo liner relatively flat while still flexible. Preferably, sleeve **20** is sewn or otherwise attached to floor **12**, and the lower edge **18** of wall **14** is secured by stitching or comparable methodologies to the upper edge of sleeve **20**. Preferably, the material for wall **14** is of sufficient resilience to prevent the wall to be readily folded as further described herein, but at the same time wall **14** is of

sufficient stiffness as to permit wall **14** to remain substantially upright when the cargo liner **10** is in its unfolded configuration as shown in **Figure 1**.

To permit cargo liner **10** to be readily folded into a compact package for storage and transportation, the frame **22** may be easily reconfigured as a folded frame as shown in **Figure 3A**. To fold the cargo liner **10**, any portion of any side of the perimeter **11** is grasped and folded over the remaining walls of the cargo liner. This first step creates three loops of the frame **22** and sleeve **20**, as shown in **Figure 3A**, the loops being designated as **30**, **32** and **34**. Loop **34** is then twisted 180° to overlay loop **32**. This step urges loop **30** to overlies loops **32** and **34** as shown in **Figures 3B** and **3C**. Once the folding process has been completed as shown in **Figure 3C**, the folded cargo liner consists of three interconnected loops of frame **22** and fabric. The folded cargo liner occupies space having a diameter only one-third that of the unfolded diameter of the cargo liner **10**, and having an overall thickness only slightly thicker than the unfolded configuration of the cargo liner **10**. Because of the flexibility of the floor **12**, wall **14** and sleeve **20**, the folded configuration of the cargo liner as shown in **Figure 3C** is readily portable and easily stored either inside or outside the vehicle in which the cargo liner is used.

Because the spring steel frame **22**, in its coiled configuration as shown in **Figure 3C** has a tendency, when not restrained, to return to the unfolded configuration shown in **Figure 1**, it is desirable to secure the three coils **30**, **32** and **34** together. This may be done by simply tying the folded cargo liner with suitable securing ties, or by storing the folded liner in a portable enclosure **60**, such as shown in **Figure 4**. **Figure 4** depicts the folded cargo liner **10** ready to be placed in container **40**. Container **40** is typically in the form of a flexible flat bag-like container, such as a knapsack. Preferably, container **40** is provided with a closure **44**, such as

a zipper, and one or more carrying straps **42**. Placement of the folded cargo liner **10** into the bag **40**, followed by closure of the closure **44** serves to restrain the cargo liner **10** from unfolding. Container **40** provides protection to the folded cargo liner **10**, in addition to rendering it easily transportable.

In one embodiment, to prevent the cargo liner **10** from moving in relation to the area of the vehicle in which cargo liner **10** is installed, the floor **12** of cargo liner **10** is provided with fasteners **13**, adapted to engage the upper surface of the area in which the cargo liner **10** is placed. In one embodiment, fasteners **13** are in the form of the "hook" material commonly used as part of a "hook and loop" fastener, such as Velcro™. The use of the "hook" portion of the Velcro™ fastener is advantageous inasmuch as this portion of the hook and loop fastener is well adapted to removably engage the surface of motor vehicle carpeting, commonly found in cargo areas, passenger areas and trunks of motor vehicles. Other fasteners such as snaps may be used, but are less desirable in that they require corresponding placement in the cargo area and on the cargo liner **10** of complimentary matting portions of such fasteners, correctly positioned for engagement when the cargo liner is in use.

It will be apparent from this description, to those skilled in the art, that numerous minor alterations and modifications to the invention may be made without departing from the scope of the invention herein described, which I claim as follows: